



# Knowledge Management across Task/Team Boundaries

To enhance the effective collaboration, communication and decision-making across interacting organizations and corporate entities, this research develops multi-level interventions related to policies, procedures and practices that support a standard shared framework for the management of distributed knowledge systems.

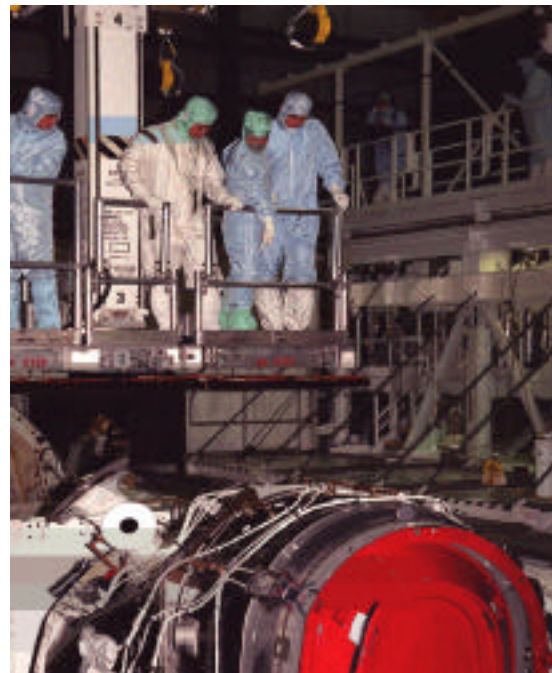
## Background

Space operations are high-risk complex operations that involve numerous teams with different but highly inter-dependent goals and objectives. However, knowledge management in mission operations, launch and landing, ground processing, logistics, maintenance and engineering has tended to be implemented and supported independently along functional and organizational lines.

The need for multi-organization expertise requires smooth and effective ways to collaborate and interface in spite of differences in task objectives, priorities, skill sets, schedules and locations. Unfortunately, teaming often results in conflicts of interest and inefficiencies. In the worst cases, serious miscommunications and false expectations may lead to production errors as well as performance and safety decrements.

Industry standards deter some inconsistencies across organizations, but fail to provide optimal solutions. Clearly, this process involves more than technical compatibility of hardware, software and procedures. Rather, its long-term success relies upon appropriate changes in overlapping processes, their interfaces, the roles and responsibilities upon which they are built, and appropriate levels of management control and support.

Knowledge management across corporate, task and team boundaries has always been problematic, but the challenge increases exponentially when the “paper” transfer of information becomes electronic. While electronic data transfer can reap great efficiencies, and the benefit of data re-usability across divisional lines, unanticipated incompatibilities must be considered and resolved far in advance of time-critical information need. Among the benefits of a new approach to knowledge management across task/team boundaries is the timely access of archival engineering information to real time operations as well as the real time transfer between flight operations, ground processing and engineering support teams.



*Mission Specialists and Boeing workers in Crew Equipment Interface Test activities.*

## Research Overview

In order to enhance the current knowledge management system across task/team boundaries, 1) develop an approach and tools for identifying differences in overlapping processes and interfaces (including procedures and documents), 2) examine the compatibility of roles and responsibilities (including policy structure) across interfacing organizations, 3) determine and demonstrate the need for related changes in requirements, procedures, training and metrics.

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### Objectives:

Based on existing and emerging technologies, research focuses on implementation aspects of enhanced electronic information transfer across divisional lines, recognizing that hybrid systems of varying levels of technology are inevitable.

Objectives also include the development of enhancements that will bridge the gap between static engineering information (e.g., maintenance and engineering) and real time operations (e.g., mission and ground processing operations). Often operational information and interpretation of information is created informally within teams and is not officially documented or shared.

A final objective is to develop two-way links so that interacting/communicating parties become collaborative partners and team resources to each other, devising appropriate standards for information structure, format, terminology and assuring that information requirements for all user groups are met.

### Approach:

A systematic process is developed for identifying level of information need by various users, and defining the specific understanding users maintain in order to make a shared information system work effectively. Because functional groups often augment their knowledge system in unofficial and undocumented ways, it is important to develop a process model that examines all levels of knowledge acquisition, usage and management and to determine information priorities through systematic, socio-technical risk modeling. Knowledge representations are enhanced so they can be effectively and consistently used across task/team boundaries

### Products:

- Identification of safety critical (real time) information transfer issues between engineering, ground resources and flight operational users
- Implementation plan for an enhanced knowledge management system across key organizational tasks/teams
- Information needs assessment conducted for each functional team and development of associated performance metrics
- Tools for: 1) achieving consistency resolution across teams, 2) tracking the effect of knowledge management enhancements, 3) collecting feedback from user communities on a continuing basis

## Relevance to Exploration Systems

The knowledge infrastructure required to promote safe and effective communication and coordination within and across organizational boundaries provides management and decision support for high-risk, complex human exploration activities.

### H&RT Program Elements:

This research capability supports the following H&RT program elements:

ASTP: Advanced Studies, Concepts and Tools;

TMP: Advanced Space Operations

### Points of Contact:

Barbara G. Kanki, PhD.  
(650) 604-5785; [barbara.g.kanki@nasa.gov](mailto:barbara.g.kanki@nasa.gov)

